**Catalogue of American Amphibians and Reptiles 915.**

Powell, R. 2018. *Leiocephalus loxogrammus*.

## *Leiocephalus loxogrammus* Cope
## Rum Cay Curly-tailed Lizard,
## San Salvador Curly-tailed Lizard

*Liocephalus loxogrammus* Cope 1887:437. Type locality, "Rum Key" (= Rum Cay), Bahama Islands. Syntypes ("numerous specimens"; Cope 1887, but see **Remarks**), National Museum of Natural History (USNM) 14569, nine adults (including at least one male with everted hemipenes) collected by C. H. Townsend (see **Remarks**) in March 1886, and Museum of Comparative Zoology, Harvard University (MCZ) R-10931, an adult female collected by "C. H. Therufis" in "186-" (see **Remarks**) (not examined by author).

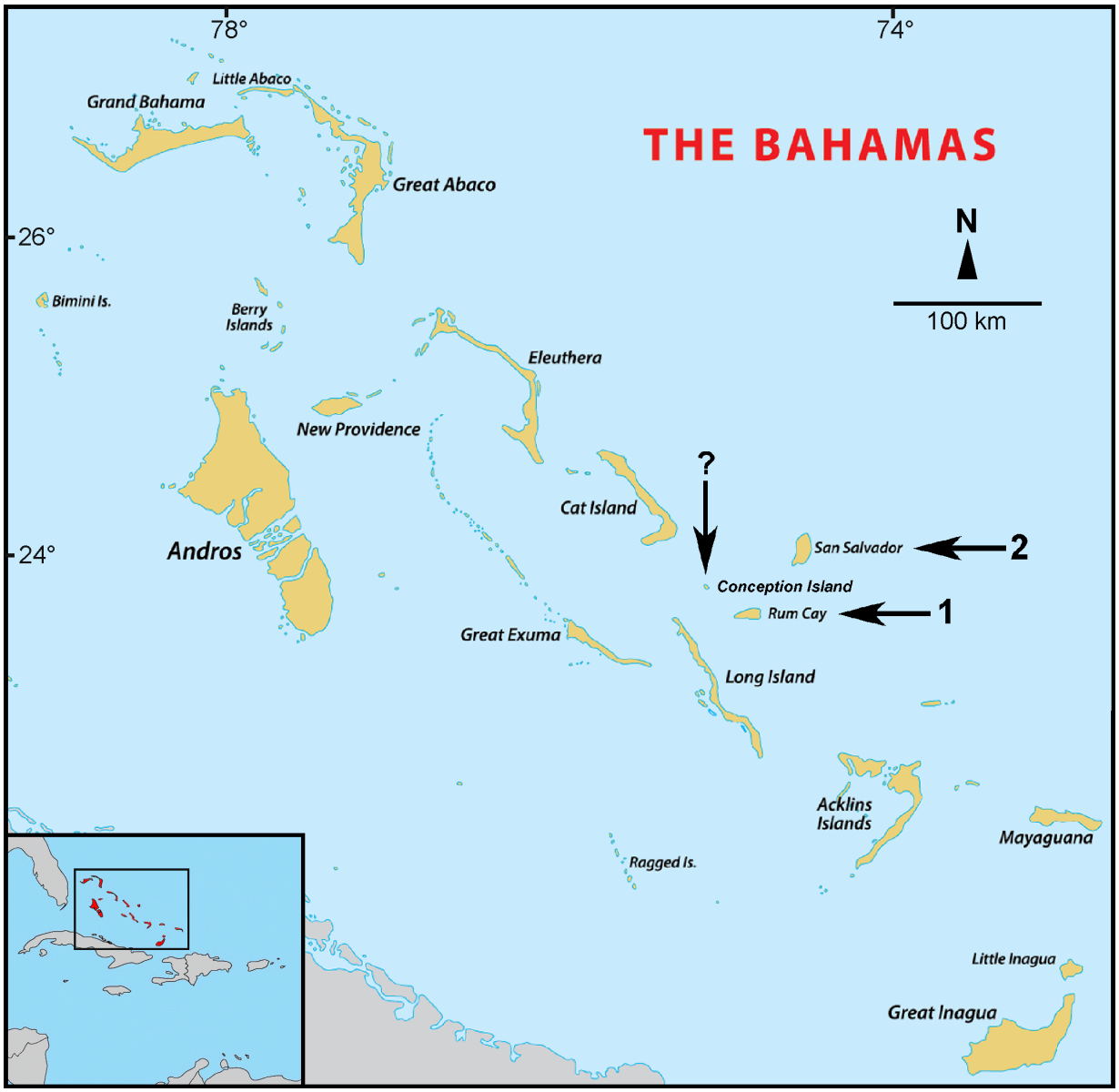
*Leiocephalus loxogrammus*: Stejneger 1905:335.

**CONTENT.** Two subspecies are recognized: *Liocephalus loxogrammus loxogrammus* and *Liocephalus loxogrammus parnelli* (but see **Comment**).

**DESCRIPTION.** *Leiocephalus loxogrammus* is a moderately sized member of the genus (maximum snout-vent length [SVL] in males is 90 mm, maximum SVL in females is 70 mm; Schwartz and Henderson 1991); however, an estimated SVL of 93 mm was recorded in a fossil from San Salvador by Olson et al. (1990). Distinct lateral folds with smaller scales in the folds are present (Schwartz and Henderson 1991). Dorsal scales are keeled and overlapping, ventral scales are smooth. Median dorsal crest scales are barely enlarged, lower than median dorsal caudal scales, and number 52–69 in occiput–vent distance; one-half midbody scales number 27–35; head scales include 5–8 (mode 6) supraoculars, 5 loreals, and 12 temporals; median head scales number 2–4, no median azygous scale is present between the posterior pair of median head scales; prefrontal row comprises five scales and always complete; frontoparietal row, complete or not, with 0–9 scales; supraorbital semicircles usually are complete, and parietals are almost always in contact; males have a pair of enlarged postcloacal scales.

**Figure 1.** Adult male *Leiocephalus loxogrammus loxogrammus* from Rum Cay, The Bahamas. Photograph by Anthony Geneva (this photograph was published previously by Herrmann 2015).

Sexual dichromatism is evident (Schwartz and Henderson 1991). Males have a brown, golden tan, to gray-brown dorsum streaked with black diagonal lines and often with yellowish flecks; 3–4 black neck bars, often with a darker middorsal zone, are present but occasionally vague or reduced to faint lines; black postorbital spots extend onto the neck as series of black blotches; sides are brown with dark dashes and golden flecks; lateral folds are creamy to pale brown and are bordered below by a darker ventral ground color, which becomes paler midventrally; limbs are pale brown to brown with scattered dark and light (often yellowish) flecks; the ventral ground color (including the throat) is bright yellow-orange and gray with transverse brown bars and admixed opalescent yellow scales; the




**Map.** The distribution of *Leiocephalus loxogrammus*. Arrows indicate the islands on which the species has been recorded (the type localities are too imprecise to plot): "1" indicates distribution of *Leiocephalus loxogrammus loxogrammus*, "2" indicates distribution of *Leiocephalus loxogrammus parnelli*, and "?" indicates a population unassigned to subspecific status.

base of the tail bears maroon dashes laterally and is bright orange below. Females have a brown dorsum, sometimes with a pair of broad, dark yellowish lines; dark postorbital spots are present but not as extensive as in males; the middorsal area has tan and yellowish scales and vague, darker crossbars or chevrons; lateral fields are dark brown with black streaks and whitish spots; lateral lines are pale brown; the venter is yellow or orange with lateral brown bars and opalescent yellow scales; the throat is cream-colored.

**DIAGNOSIS.** *Leiocephalus loxogrammus* is superficially most similar to Cuban *Leiocephalus raviceps* (see also **Phylogenetic Relationships**), but the latter has a pale whitish, gray, tan, or yellow dorsum with a pattern of grayish herringbones or fine dots and a throat without markings (Schwartz and Henderson 1985, 1991). Nevertheless, the two species are best distinguished by distribution.

**Figure 2.** Adult female *Leiocephalus loxogrammus* (undetermined subspecies) from Conception Island, The Bahamas. Photographs by Joe Burgess.

*Leiocephalus loxogrammus* can be distinguished from all Bahamian congeners by distribution and the following characteristics (Schwartz and Henderson 1985, 1991): *Leiocephalus greenwayi* (East Plana Cay) is small (maximum SVL 75 mm), has 64–75 median dorsal crest scales from occiput to vent, and has a greenish-brown dorsal ground color; *Leiocephalus punctatus* (Crooked-Acklins Bank and Samana Cay) has a brown to almost bronze dorsum with brassy or gray dots on a darker ground color or a pair of bronzy stripes and a head mottled with grayish white dots; *Leiocephalus carinatus* (Great and Little Bahama Banks, Cat Island, Little San Salvador Island) is large (maximum SVL to 130 mm) and has a rather uniform dorsum or bears vague crossbars or large, black lateral blotches; and *Leiocephalus inaguae* (Great Inagua Island) has 52–69 median dorsal crest scales from occiput to vent and a dorsum bearing a series of darker brown transverse rectangles or "dumbbells" that correspond to lateral series of brownish squares.

**PHYLOGENETIC RELATIONSHIPS.** The similarity of *Leiocephalus loxogrammus* and *Leiocephalus raviceps* in Cuba was first commented on by Barbour and Shreve (1935:359): "The general coloration [of *Leiocephalus loxogrammus parnelli*] resembles quite closely certain specimens of the Cuban *Leiocephalus raviceps*." A subsequent quote that *Leiocephalus loxogrammus* was "obviously related to Cuban species" was made by Schwartz (1967a). The resemblance of the two species was noted by Schwartz (1967b:183): "Indeed, despite the hiatus in their known ranges, [*Leiocephalus*] *raviceps* and [*Leiocephalus*] *loxogrammus* are extremely close to one another, and might best be regarded as only subspecifically related (I do not make this nomenclatural change here, but merely suggest that it may be done in the future)."

Based on morphological (including skeletal), meristic, and pattern variables, the relationship of the Cuban *Leiocephalus raviceps* and the stem of *Leiocephalus raviceps* + *Leiocephalus loxogrammus* was most closely allied with Hispaniolan *Leiocephalus lunatus* + *Leiocephalus personatus* (Pregill 1992). These four species were found within a clade comprising mainly Hispaniolan species (*Leiocephalus barahonensis*, *Leiocephalus lunatus*, *Leiocephalus personatus*, *Leiocephalus pratensis*, *Leiocephalus rhutidira*, *Leiocephalus semilineatus*, *Leiocephalus vinculum*) but also including three Cuban species (*Leiocephalus cubensis*, *Leiocephalus raviceps*, *Leiocephalus stictigaster*) and the single Bahamian species (*Leiocephalus loxogrammus*) (Pregill 1992).

Using albumin immunological methods,

lizards in the genus *Leiocephalus* represent a relatively recent radiation, with the oldest divergences within the genus occurring less than 10 mya (Hass et al. 2001). These data indicated that *Leiocephalus loxogrammus*, along with *Leiocephalus greenwayi* and *Leiocephalus punctatus*, showed immunological divergence values similar to those for Cuban congeners.

**PUBLISHED DESCRIPTIONS.**
In addition to the original descriptions (Cope 1887; Barbour and Shreve 1935), a detailed description was provided by Schwartz and Henderson (1991). Several morphological (including skeletal), meristic, and pattern characters were listed by Pregill (1992).

**ILLUSTRATIONS. Color photographs** were published by B. C. Dlugolecki et al. (2015), K. J. Dlugolecki et al. (2015), Hedges (2017), Herrmann (2015), and Hillbrand et al. (2011). Color photographs (dorsal and ventral views, lateral, dorsal, and ventral views of the head) of MCZ syntype R-10931 are available via MCZBASE (MCZ 2017a) and similar images of the holotype of *Leiocephalus loxogrammus parnelli* (MCZ R-36748) are available at MCZ 2017b); all of those images also are accessible at EOL (2014). **Black-and-white photographs** of an adult male, an adult female, post-anal scales of both sexes, and habitat were provided by Morrison and Peoples (2011).

**DISTRIBUTION.** The range was illustrated by Hedges (2017) and Schwartz and Henderson (1991).

*Leiocephalus loxogrammus* is known to occur on Rum Cay (*Leiocephalus loxogrammus loxogrammus*), San Salvador (*Leiocephalus loxogrammus parnelli*), and Conception Island (undetermined subspecies) (Buckner et al. 2012). Additional material to determine the taxonomic status of the lizards on Conception Island was thought to be needed by Franz and Buckner (1998), although the population on Conception

**Figure 3.** A juvenile *Leiocephalus loxogrammus parnelli* from the ruins of "Watling's Castle" on San Salvador, The Bahamas. Photograph by Abby Tate (this photograph was published previously by Hillbrand et al. 2011).

Island later was attributed to *Leiocephalus loxogrammus loxogrammus* by Henderson and Powell (2009). Small populations existing on Catto and High cays off San Salvador were noted by Hillbrand et al. (2011). Based on fieldwork by A. Schwartz across the three islands where the species is known to occur, these curlytails occur along edges of large open areas, particularly in rocky sites, but also on sandy beaches, vegetated coastal habitats, and even in human settlements, but are less frequently encountered in denser scrub and shrubby situations (Schwartz and Henderson 1991).

On Rum Cay, "incredibly high densities of the San Salvador curlytail lizard, *Leiocephalus loxogrammus*" were found in a "shrubby forest" by Herrmann (2015), who also noted that his party observed no *Anolis sagrei* on the ground at that site.

On San Salvador, the species is most

abundant on the windward side (Olson et al. 1990). The naturalists of the U.S. Fish Commission, who, during the cruise of the steamer *Albatross*, collected the type specimens on Rum Cay, failed to collect any material on San Salvador — but they apparently confined their activity to the leeward side of the island (Pregill 1992). Most of the specimens noted by  were collected in open scrub at Kerr Mount in the southeastern quadrant. Reports by Hillbrand et al. (2011) indicated that those lizards were abundant in ruins dating back to the loyalist era (1783–1834; see Baxter 2016), and I have seen them in considerable numbers in some of the quarries dating to the same period.

On Conception Island, an adult female was in coastal scrub and two juveniles were in palm/sea grape thickets (Franz and Buckner 1998).

**FOSSIL RECORD.** Holocene fossils of *Leiocephalus loxogrammus* were recovered from several sinkholes located in the southern and eastern sections of San Salvador by Olson et al. (1990).

**PERTINENT LITERATURE.** In addition to the **original descriptions** (Barbour and Shreve 1935; Cope 1887), relevant citations are listed by topic: **activity** (K. J. Dlugolecki et al., 2015), **behavior** (B. C. Dlugolecki et al., 2015), **conservation status** (Buckner et al., 2016), diet (Schoener et al., 1982), **general natural history** (Henderson and Powell, 2009; Hillbrand et al., 2011; Schwartz and Henderson, 1991), **sexual dimorphism** (Morrison and Peoples, 2011; Schoener et al., 1982), and **systematics** (Pregill, 1992).

The species also was included in various general works (some including brief descriptions), checklists, faunal accounts, or articles focusing on other species: Alfonso et al. (2012), Bahamas National Trust (2010), Barbour (1914, 1930, 1935, 1937), Barbour and Loveridge (1929, 1946), Bergmann (2008), Buden (1981), Bursey and Goldberg (1994), Cochran (1934, 1961), Cooper and Vitt (2002), Elliott et al. (1986), EOL (2014), Etheridge (1966a, 1966b, 2000), Frank and Ramus (1995), Franz et al. (1996), Garman (1888), Hedges (2017), Henderson and Powell (2004), Herrmann (2015), Knapp et al. (2011), Liner (1997), Living National Treasures (2013), MacLean et al. (1977), Maynard (1889), Powell et al. (1996), Rodriguez Schettino (2009), Rosén (1911), Schmidt (1936), Schwartz (1965, 1967a, 1967b), Schwartz and Garrido (1967), Schwartz and Henderson (1985, 1988, 1991), Schwartz and Thomas (1975), Schwartz et al. (1978), Stejneger (1905), Thomas (1966), Tolson (1987), Townsend (1901), Uetz et al. (2017), Vincent and Herrel (2007), Wiens

**Figure 4.** Lizards in the genus *Leiocephalus* are usually terrestrial, but will occasionally forage in low vegetation or climb onto elevated perches to escape predators or avoid contact with intensely hot substrates. This female *Leiocephalus loxogrammus parnelli* was photographed near the mouth of Pigeon Creek on San Salvador, The Bahamas. Photograph by Tiffany Schultheis (this photograph was published previously by Hillbrand et al. 2011 and K. J. Dlugolecki et al. 2015).

(1993), Wikipedia (2017), and Wrobel (2004). See **Remarks** for comments on tail-curling behavior and information on the conservation status of the species.

**REMARKS.** Ten "cotypes" for *Leiocephalus loxogrammus* in the USNM collection were listed by Cochran (1961), who noted that one was exchanged to MCZ in 1915; however, the USNM original ledger listed 13 individuals and also noted the exchange with MCZ. The nine specimens currently in the USNM collection (A. Wynn, personal communication, 19 June 2017) agree with Cochran; the fate of the additional specimens is unknown.

The collection date for MCZ syntype R-10931 was listed as "no verbatim date data" and the date of collection was recorded as "186-" (MCZ 2017a), despite the collection date being listed as March 1886 in the original USNM ledger and by Cochran (1961). Similarly, some confusion exists regarding the collector(s) of the syntypes. "Messrs. C. H. Townsend, J. E. Benedict, and Fisher, of the U. S. Fish Commission, during the cruise of the steamer *Albatross*, at Cat Island, Watling's Island; Rum Key, New Providence, and Abaco" were named as collectors by Cope (1887). The ledger lists "U.S. Fish Com[mission]., 'Str. Albatross'." However, C. H. Townsend was listed as the only collector by Cochran (1961). Charles Haskins Townsend (1859–1944) was an Assistant U.S. Fish Commissioner, a naturalist on the U.S.S. *Albatross* deep-sea investigations in 1886–1896, and might well have been the collector of the syntypes (K. de Queiroz, personal communication, 20 June 2017; see also Townsend 1901). The three collectors named by Cope (1887) were listed by Pregill (1992). Finally, the collector of MCZ syntype R-10931 was listed as "C.H. Therufis" (MCZ 2017a), which likely is a misspelling of "C. H. Townsend" and probably is attributable to poor penmanship on the record sent with the specimen in 1915.

Only Barbour was listed as the collector of the holotype of *Leiocephalus loxogrammus parnelli* (R-36748) by Barbour and Shreve (1935); however, the original MCZ ledger listed "Thomas Barbour and J. C. Greenway" as collectors (J. Rosado, personal communication, 18 June 2017).

Tail-curling behavior is not universally present in species of *Leiocephalus*. This behavior was observed in *Leiocephalus loxogrammus* by Pregill (1992), but tail-curling was never observed by Maynard (1889) or Hillbrand et al. (2011), and I have not seen it in *Leiocephalus loxogrammus parnelli* during multiple trips to San Salvador. In describing lizards caught on Conception Island (specimens were lost), it was noted by Schwartz et al. (1978) that "neither young nor adults curled their tails in a vertical watch-spring-like coil over the back…" I can only conclude that this behavior is rarely expressed in this species.

This species is listed as being of Least Concern (LC) on the IUCN Red List of Threatened Species (Buckner et al. 2016).

**COMMENT.** *Leiocephalus loxogrammus parnelli* was described from a single female collected on San Salvador by Barbour and Shreve (1935). Although *Leiocephalus loxogrammus parnelli* was labeled by Barbour (1935, 1937) as "a well defined local race," many of the distinguishing characteristics of the holotype can be attributed to comparing this female to both male and female syntypes of *Leiocephalus loxogrammus* from Rum Cay. Whether the continued recognition of these subspecies is valid remains to be seen.

**ETYMOLOGY.** Although not stated by Cope (1887), the specific epithet presumably is derived from the Greek *loxos* (= slanting) and *gramma* (= letter or mark), possibly an allusion to the black diagonal lines on the backs of males. The subspecific epithet *parnelli* is a patronym honoring Fr. Denis Parnell, "parish priest at Cockburntown, only white inhabi-

tant of Watling's Island, guide, counselor and friend to all who live upon or visit San Salvador" (Barbour and Shreve 1935).

**ADDITIONAL VERNACULAR NAMES.** Rum Cay Curlytail Lizard was listed by Frank and Ramus (1995), EOL (2014), and Uetz et al. (2017), and San Salvador Curlytail was used by Hedges (2017); both names were listed by Wrobel (2004). These two names and a third, Rum Cay Curlytail, were listed by Buckner et al. (2016). The Gray Lizard was used by Maynard (1889).

### 1. *Leiocephalus loxogrammus loxogrammus* Cope

*Liocephalus loxogrammus* Cope 1887:437. See species synonymy.

*Leiocephalus loxogrammus*: Barbour 1914: 300.

*Leiocephalus loxogrammus loxogrammus*: Barbour and Shreve 1935:359.

**DIAGNOSIS.** This subspecies is characterized by a darker grayish-brown dorsal ground color with a "rather coppery sheen," speckled and streaked dorsally (only occasionally with indications of a brown middorsal streak comprising confluent spots), and marked white spotting on the sides of the neck (Barbour and Shreve 1935).

### 2. *Leiocephalus loxogrammus parnelli* Barbour and Shreve

*Leiocephalus loxogrammus*: Stejneger 1905:335.

*Leiocephalus loxogrammus parnelli* Barbour and Shreve 1935:359. Type locality, "San Salvador or Watling's Island, Bahamas." Holotype, Museum of Comparative Zoology, Harvard University (MCZ) R-36748, an adult female collected by T. Barbour and J. C. Greenway (see **Remarks**) in February 1933 (not examined by author).

**DIAGNOSIS.** Based largely on the female holotype, this subspecies was characterized by Barbour and Shreve (1935) as having a light yellowish-brown dorsal ground color, few dorsal specks or streaks (instead with a brown middorsal stripe comprising confluent spots), and no white spotting on the sides of the neck.

**ACKNOWLEDGMENTS.** Addison Wynn and Kevin de Queiroz, National Museum of Natural History, were phenomenally helpful in efforts to clarify the confusion over the number of syntypes, the collector(s) of the series, and the date of collection; the former also examined the nine remaining USNM syntypes. José Rosado, Museum of Comparative Zoology, Harvard University, graciously examined the MCZ syntype of *Leiocephalus loxogrammus* and the holotype of *Leiocephalus loxogrammus parnelli*. Jared E. Hughes, and Jonathan B. Losos provided references. Darrel R. Frost clarified the status of the unpublished database (Etheridge 2000) maintained by the AMNH. Anthony Geneva, Abby Tate, and Tiffany Schultheis granted permission to use their photographs in this account.

## LITERATURE CITED

Alfonso, Y. U., G. Fajardo, E. Suarez, and K. L. Krysko. 2012. Sexual dimorphism, ovipositioning, and hatching in *Leiocephalus macropus asbolomus* (Squamata: Leiocephalidae) in Alexander von Humboldt National Park in eastern Cuba. IRCF Reptiles & Amphibians 19:230–236.

Bahamas National Trust. 2010. Reptiles of the Bahamas. Curly-tailed Lizard. The Bahamas National Trust, Nassau. Available at http://bnt.bs/wp-content/uploads/2016/03/curlytailedlizards.pdf. Archived by WebCite at http://www.webcitation.org/6rITamG1o on 17 June 2017.

Barbour, T. 1914. A contribution to the zoögeography of the West Indies, with especial reference to amphibians and reptiles. Memoirs of the Museum of Comparative Zoölogy at Harvard College 44:205–359, 1 plate.

Barbour, T. 1930. A list of Antillean reptiles and amphibians. Zoologica (Scientific Contributions of the New York Zoological Society) 11:61–116.

Barbour, T. 1935. A second list of Antillean reptiles and amphibians. Zoologica (Scientific Contributions of the New York Zoological Society) 19:77–141.

Barbour, T. 1937. Third list of Antillean reptiles and amphibians. Bulletin of the Museum of Comparative Zoölogy at Harvard College 82:77–166.

Barbour, T. and A. Loveridge. 1929. Typical reptiles and amphibians in the Museum of Comparative Zoölogy. Bulletin of the Museum of Comparative Zoölogy at Harvard College 69:205–360.

Barbour, T. and A. Loveridge. 1946. First supplement to typical reptiles and amphibians. Bulletin of the Museum of Comparative Zoölogy at Harvard College 96:59–214.

Barbour, T. and B. Shreve. 1935. Concerning some Bahamian reptiles, with notes on the fauna. Proceedings of the Boston Society of Natural History 40:347–365.

Baxter, J. E. 2016. A comparative view of San Salvador's plantations. Pp. 99–107 *in* Proceedings of the Fifteenth Symposium on the Natural History of the Bahamas (R. Erdman and R. Morrison, editors). Gerace Research Centre, San Salvador, Bahamas.

Bergmann, P. J. 2008. A Phylogenetic and Functional Approach to the Study of the Evolution of Body Shape in Lizards (Squamata). Ph.D. Dissertation, University of Massachusetts Amherst, Amherst, Massachusetts. xiv + 198 pp.

Buckner, S. D., R. Franz, and R. G. Reynolds. 2012. Bahama Islands and Turks & Caicos Islands. Pp. 93–110 *in* Island lists of West Indian amphibians and reptiles (R. Powell and R. W. Henderson, editors). Bulletin of the Florida Museum of Natural History 51(2).

Buckner, S., R. Powell, and R. Reynolds. 2016 (errata version published in 2017). *Leiocephalus loxogrammus*. The IUCN Red List of Threatened Species 2016: e.T75308180A115482798. Available at http://www.iucnredlist.org/details/full/75308180/0 - sectionErrata. Archived by WebCite at http://www.webcitation.org/6rGmHEV4x on 16 June 2017.

Buden, D. W. 1981. Endemism and patterns of distribution among terrestrial vertebrates in the Bahamas. The Bahamas Naturalist 5(2):2–18.

Bursey, C. R. and S. R. Goldberg. 1994. *Physalopteroides bahamensis* n. sp. (Nematoda: Spiruroidea) from the Cuban Treefrog *Osteopilus septentrionalis* (Hylidae) from San Salvador Island, Bahamas. Transactions of the American Microscopical Society 113:169–176.

Cochran, D. M. 1934. Herpetological collections from the West Indies made by Dr. Paul Bartsch under the Walter Rathbone Bacon Scholarship, 1928-1930. Smithsonian Miscellaneous Collections 92(7):1-48.

Cochran, D. M. 1961. Type specimens of reptiles and amphibians in the United States National Museum. Smithsonian Institution United States National Museum Bulletin 220: xv + 291 pp.

Cooper, W. E., Jr. and L. J. Vitt. 2002. Distribution, extent, and evolution of plant consumption by lizards. Journal of Zoology (London) 257:487–517.

Cope, E. D. 1887. List of the Batrachia and Reptilia of the Bahama Islands. Proceedings of the United States National Museum 10:436–439.

Dlugolecki, B. C., E. M. Karle, D. L. Winter,

and K. A. Koehler. 2015. Approach distances and escape behavior of the San Salvador Curly-tailed Lizard, *Leiocephalus loxogrammus parnelli*. IRCF Reptiles & Amphibians 22:24–26.

Dlugolecki, K. J., D. R. Deisher, M. D. Karle, and N. P. Kemp. 2015. Diurnal activity of the San Salvador Curly-tailed Lizard (*Leiocephalus loxogrammus parnelli*). IRCF Reptiles & Amphibians 22:20–23.

Elliott, N. B., T. Shlotzhauer, and W. M. Elliott. 1986. Nest use by females of the presocial wasp *Cerceris watlingensis* (Hymenoptera: Sphecidae). Annals of the Entomological Society of America 79:994–998.

EOL (Encyclopedia of Life). 2014. *Leiocephalus loxogrammus*. Rum Cay Curlytail Lizard. Available at http://eol.org/pages/792324/overview. Archived by WebCite at http://www.webcitation.org/6rIBKCrSV on 17 June 2017.

Etheridge, R. 1966a. An extinct lizard of the genus *Leiocephalus* from Jamaica. Quarterly Journal of the Florida Academy of Sciences 29:47–59.

Etheridge, R. 1966b. The systematic relationships of West Indian and South American lizards referred to the iguanid genus *Leiocephalus*. Copeia 1966:79–91.

[Etheridge, R. E. 2000]. Leiocephalidae. Unpublished manuscript available at http://www.amnh.org/content/download/37823/558376/file/Leiocephalidae_19_Jan_2010.pdf. Archived by WebCite at http://www.webcitation.org/6rLvyrvn4 on 19 June 2017. [Etheridge not listed as author; author and date provided as personal communication from Darrel Frost].

Frank, N. and E. Ramus. 1995. A Complete Guide to Scientific and Common Names of Reptiles and Amphibians of the World. N G Publishing, Inc., Pottsville, Pennsylvania. 377 pp.

Franz, R. and S. D. Buckner. 1998. Preliminary survey of the herpetofauna of Conception Island, Bahamas. Pp. 37–40 *in* Proceedings of the Seventh Symposium on the Natural History of the Bahamas (T. K. Wilson, editor). Bahamian Field Station, Ltd., San Salvador, Bahamas.

Franz, R., C. K. Dodd, Jr., and S. D. Buckner. 1996. A review of the herpetology of the Bahamian Archipelago. Bahamas Journal of Science 3(3):22–30.

Garman, S. 1888. Reptiles and batrachians from the Caymans and from the Bahamas. Bulletin of the Essex Institute 20:101–113.

Hass, C. A., L. R. Maxson, and S. B. Hedges. 2001. Relationships and divergence times of West Indian amphibians and reptiles: Insights from albumin immunology. Pp. 157–174 *in* Biogeography of the West Indies. Patterns and Perspectives. Second Edition (C. A. Woods and F. E. Sergile, editors). CRC Press, Boca Raton, Florida.

Hedges, S. B. 2017. Caribherp. West Indian amphibians and reptiles [Amphibians and reptiles of Caribbean Islands]: Bahamas. Temple University, Philadelphia, Pennsylvania. Available at http://www.caribherp.org/index.php?il=Bahamas&so=class,ord, subord, family, species&vw=y&dd=n&mob=y. Archived by WebCite at http://www.webcitation.org/6rGqYQfoX on 16 June 2017.

Henderson, R. W. and R. Powell. 2004. Thomas Barbour and the *Utowana* voyages (1929–1934) in the West Indies. Pp. 297-309 *in* Studies in the History of Herpetological Exploration (A. M. Bauer, editor). Bonner zoologische Beiträge 52.

Henderson, R. W. and R. Powell. 2009. Natural History of West Indian Reptiles and Amphibians. University Press of Florida, Gainesville, Florida. xxiv + 496 pp.

Herrmann, N. 2015. *Anolis sagrei* on Rum Cay, Bahamas. Anole Annals: Your source for the latest on *Anolis* lizards. Available at http://www.anoleannals.org/2015/08/09/anolis-sagrei-on-rum-cay-bahamas/. Archived by WebCite at http://www.webci-

tation.org/6rIKIeNBH on 17 June 2017.

Hillbrand, P. A., A. T. Sloan, and W. K. Hayes. 2011. The terrestrial reptiles of San Salvador Island, Bahamas. IRCF Reptiles & Amphibians 18:154–166.

Knapp, C. R., J. B. Iverson, S. D. Buckner, and S. V. Cant. 2011. Conservation of amphibians and reptiles in the Bahamas. Pp. 53–87 *in* Conservation of Caribbean Island Herpetofaunas. Volume 2: Regional Accounts of the West Indies (A. Hailey, B. S. Wilson and J. A. Horrocks, editors). Brill, Leiden, The Netherlands.

Liner, E. A. 1997. Bibliography and scientific name index to the amphibians and reptiles of the Florida Academy of Sciences, Volume 1–55, 1937–1992, The Florida Field Naturalist, Volume 1–20, 1973–1992, and the Florida Naturalist, Volume 1–65, 1926–1992. Smithsonian Herpetological Information Service 113:1–39.

Living National Treasures. 2013. Checklist of endemic reptile species. Available at http://lntreasures.com/bahamasr.html. Archived by WebCite at http://www.webcitation.org/6rIKrIbKW on 17 June 2017.

MacLean, W. P., R. Kellner, and H. Dennis. 1977. Island lists of West Indian amphibians and reptiles. Smithsonian Herpetological Information Service 40:1–47.

Maynard, C. J. 1889. Notes on the habits of some of the West Indian reptiles and batrachians. Contributions to Science 1:106–115, 154–159.

MCZ (Museum of Comparative Zoology, Harvard University). 2017a. MCZBASE: The Database of the Zoological Collections. Herpetology R-10931 *Leiocephalus* loxogrammus. Syntype of *Leiocephalus loxogrammus*. Available at http://mczbase.mcz.harvard.edu/guid/MCZ:Herp:R-10931. Archived by WebCite at http://www.webcitation.org/6rLMZnyH4 on 19 June 2017.

MCZ (Museum of Comparative Zoology, Harvard University). 2017b. MCZBASE: The Database of the Zoological Collections. Herpetology R-36748 *Leiocephalus loxogrammus parnelli*. Holotype of *Leiocephalus loxogrammus parnelli*. Available at http://mczbase.mcz.harvard.edu/guid/MCZ:Herp:R-36748. Archived by WebCite at http://www.webcitation.org/6rGb1R14I on 16 June 2017.

Morrison, R. L. and E. A. Peoples. 2011. Sexual dimorphism and population structure in the San Salvador curly-tailed lizard (*Leiocephalus loxogrammus parnelli*). Pp. 75–80 *in* Proceedings of the Fourteenth Symposium on the Natural History of the Bahamas (C. Tepper and R. Shaklee, editors). Gerace Research Centre, San Salvador, Bahamas.

Olson, S. L., G. K. Pregill, and W. B. Hilgartner. 1990. Studies on fossil and extant vertebrates from San Salvador (Watling's) Island, Bahamas. Smithsonian Contributions to Zoology 508:1–15.

Powell, R., R. W. Henderson, K. Adler, and H. A. Dundee. 1996. An annotated checklist of West Indian amphibians and reptiles. Pp. 51–93, Plates 1–8 *in* Contributions to West Indian Herpetology: A Tribute to Albert Schwartz (R. Powell and R. W. Henderson, editors). Contributions to Herpetology, Volume 12. Society for the Study of Amphibians and Reptiles, Ithaca, New York.

Pregill, G. K. 1992. Systematics of the West Indian lizard genus *Leiocephalus* (Squamata: Iguania: Tropiduridae). The University of Kansas Museum of Natural History Miscellaneous Publication 84:1–69.

Rodriguez Schettino, L. 2009. Reptile diversity in an amazing tropical environment: The West Indies. Pp. 72–110 *in* Tropical Biology and Conservation Management Volume VIII: Zoology (K. Del Claro, P. S. Oliveira, and V. Rico-Gray, editors). Encyclopedia of Life Support Systems (EOLSS), Developed under the Auspices of the UNESCO, EOLSS Publishers, Paris,

France.

Rosén, N. 1911. Contributions to the Fauna of the Bahamas I. A general account of the fauna, with remarks on the physiography of the islands. II. The Reptiles. III. The Fishes. Lunds Universitets Årsskrift, ny följd, Afdelning 2, 7(5):1–72 + 1 plate.

Schmidt, K. P. 1936. Notes on Bahaman reptiles and amphibians. Zoological Series of Field Museum of Natural History 20:127–133.

Schoener, T. W., J. B. Slade, and C. H. Stinson. 1982. Diet and sexual dimorphism in the very catholic lizard genus, *Leiocephalus* of the Bahamas. Oecologia 53:160–169.

Schwartz, A. 1965. The *Leiocephalus* (Lacertilia, Iguanidae) of Hispaniola I. *Leiocephalus melanochlorus* Cope. Journal of the Ohio Herpetological Society 5:39–48.

Schwartz, A. 1967a. The *Leiocephalus* (Lacertilia, Iguanidae) of Hispaniola. II. The *Leiocephalus personatus* complex. Tulane Studies in Zoology 14:1-53.

Schwartz, A. 1967b. The *Leiocephalus* (Lacertilia, Iguanidae) of the southern Bahama Islands. Annals of Carnegie Museum 39:153–185.

Schwartz, A. and O. H. Garrido. 1967. A review of the Cuban iguanid lizard *Leiocephalus macropus* Cope. Reading Public Museum and Art Gallery Scientific Publications 14:1–41.

Schwartz, A. and R. W. Henderson. 1985. A Guide to the Identification of the Amphibians and Reptiles of the West Indies Exclusive of Hispaniola. Milwaukee Public Museum, Milwaukee, Wisconsin. 165 pp.

Schwartz, A. and R. W. Henderson. 1988. West Indian Amphibians and Reptiles: A Check-list. Milwaukee Public Museum Contributions in Biology and Geology 74. 264 pp.

Schwartz, A. and R. W. Henderson. 1991. Amphibians and Reptiles of the West Indies: Descriptions, Distributions, and Natural History. University of Florida Press, Gainesville, Florida. xvi + 720 pp.

Schwartz, A. and R. Thomas. 1975. A Check-list of West Indian Amphibians and Reptiles. Carnegie Museum of Natural History, Special Publication 1. 216 pp.

Schwartz, A., R. Thomas, and L. D. Ober. 1978. First Supplement to a Check-list of West Indian Amphibians and Reptiles. Carnegie Museum of Natural History Special Publication 5. 35 pp.

Stejneger, L. 1905. Batrachians and land reptiles of the Bahama Islands. Pp. 327–343 *in* The Bahama Islands (G. B. Shattuck, editor). The Geographical Society of Baltimore. Johns Hopkins Press, Baltimore, Maryland, and The MacMillan Company, New York, New York.

Thomas, R. 1966. A reassessment of the herpetofauna of Navassa Island. Journal of the Ohio Herpetological Society 5:73–89.

Tolson, P. J. 1987. Phylogenetics of the boid snake genus *Epicrates* and Caribbean vicariance theory. Occasional Papers of the Museum of Zoology, The University of Michigan 715:1–68.

Townsend, C. H. (compiler). 1901. Dredging and other records of the United States Fish Commission steamer Albatross, with bibliography relative to the work of the vessel. Pp. 387–562, Plates I to VII *in* U. S. Commission of Fish and Fisheries, Part XXVI. Report of the Commissioner for the Year Ending June 30, 1900. Washington Government Printing Office, Washington, D.C.

Uetz, P., J. Hallermann, and J. Hošek (editors). 2017. The Reptile Database. *Leiocephalus loxogrammus* (Cope, 1887). Available at http://reptile-database.reptarium.cz/species?genus=Leiocephalus&species=loxogrammus&search_param=%28%28search=%27leiocephalus+loxogrammus%27%29%29. Archived by WebCite at http://www.webcitation.org/6rGr0re6w on 16 June 2017.

Vincent, S. E. and A. Herrel. 2007. Functional and ecological correlates of ecologically-based dimorphisms in squamate reptiles. Integrative & Comparative Biology 47:172–188.

Wiens, J. J. 1993. Phylogenetic relationships of phrynosomatid lizards and monophyly of the *Sceloporus* group. Copeia 1993:287–299.

Wikipedia. 2017. *Leiocephalus loxogrammus*. Available at https://en.wikipedia.org/w/index.php?title=Leiocephalus_loxogrammus&oldid=779915791. Archived by WebCite at http://www.webcitation.org/6vW2OUlHD on 6 December 2017.

Wrobel, M. (compiler). 2004. Elsevier's Dictionary of Reptiles in Latin, English, German, French and Italian. Elsevier, Amsterdam, The Netherlands.

**ROBERT POWELL**, Department of Biology, Avila University, Kansas City, MO 64145, USA (robert.powell@avila.edu).

Primary editors for this account, Christopher J. Bell and Travis J. LaDuc.

Published 15 March 2018 and Copyright © 2018 by the Society for the Study of Amphibians and Reptiles.